METHOD AND APPARATUS FOR REMOTE MAINTENANCE, TROUBLESHOOTING, AND REPAIR OF A MOTORIZED WHEELCHAIR

BACKGROUND OF THE INVENTION

The present invention relates to the wheelchair arts. The invention finds particular application in conjunction with the remote maintenance, troubleshooting, and/or repair of electric or motorized wheelchairs and will be described with particular reference thereto. However, it should be appreciated that the present invention may also find application in conjunction with other systems and applications where remote communications for purposes of maintaining, troubleshooting and/or repairing an object or device is desirable.

Control technology has been increasingly incorporated into motorized wheel chairs. It is now standard practice to incorporate controllers in motorized wheelchairs for controlling and monitoring various wheelchair functions such as forward speed, reverse speed, turning speed, acceleration, sensitivity, torque, braking, joystick commands, etc. As a result, the performance characteristics of each motorized wheelchair can be optimized for each user based on various criteria such as the user's desires, the user's physical capabilities, the type of environment or surroundings that the wheelchair will be operated in, etc.

In part for safety considerations, convenience, and flexibility, it is known to provide a wheelchair user with a number of user-selectable performance or drive programs to control the operation of a motorized wheelchair. For instance, if a user is operating a wheelchair in a home or office environment where precise wheelchair control is desired to properly navigate through hallways and doorways, etc., the user may select the appropriate drive program which has all drive parameters optimized for precise control. For instance, the sensitivity of the joystick may be increased and the torque of the drive motors reduced in order to provide more precise joystick control of the wheelchair to facilitate navigating in tight or closed spaces. In other instances, the user may be in an open environment such as a sidewalk, mall, airport, etc. where speed performance is more desirable than precision joystick control. In this instance, the user may select a second drive program which optimizes the wheelchair drive parameters for open driving environments. Drive programs may also be selected for sloped terrains where motor torque parameters are optimized.

Typically, the drive parameters of each wheelchair program are set to standard, nominal, or default values by either the manufacturer, dealer, or service technician. Thus, the user may be provided with a number of standard, preprogrammed, drive programs to select from as the occasion may provide. Typically, each parameter of each drive program can be varied from the nominal or default value in order to accommodate the particular needs of each user. However, the parameters of each drive program can only be modified through a programming device which is directly coupled to an input port associated with the wheelchair controller.

Although programming devices can be purchased from manufacturers/dealers, in most instances, drive parameters are modified by qualified service personnel during service calls to the user, or at dealer repair facilities. In both cases, time, effort, and expenses are incurred in having a technician service (e.g. modify the drive parameters) the wheelchair.

Another result of incorporating controllers into motorized wheelchairs, and thus increasing the complexity thereof, is the potential for increased malfunctions. Malfunctions, whether real or transitory, translate into increased service calls. On-board diagnostics and fault logging are also known. For safety reasons, when an error or fault is detected, the on-board controller typically shuts-down the wheelchair until the wheelchair can be serviced. As with modifying the wheelchair drive parameters, time, effort, and expenses are incurred in having a technician service (e.g. troubleshoot, diagnose, and/or repair) the wheelchair.

Accordingly, it has been considered desirable to develop a new and improved method and apparatus for the remote maintenance, troubleshooting, and/or repair of electric or motorized wheelchairs which meets the above-stated needs and overcomes the foregoing difficulties and others while providing better and more advantageous results.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, a method of remote communication with a motorized wheelchair having a controller associated therewith is disclosed. The method includes establishing a data communications link with the controller, uploading first data from the controller across the data communications link to a remote data processing unit for display on a video monitor, and terminating the data communications link after the controller acknowledges receipt of the second data.

In accordance with a second aspect of the present invention, a wheelchair diagnostic system is disclosed. The wheelchair diagnostic system includes a data communications network, a motorized wheelchair having a controller associated therewith, a modem coupled between the controller and the data communications network, a remote data processing unit coupled to the data communications network, and a diagnostics tool executing on the remote data processing unit which facilitates communicating with the controller across the data communications network, the diagnostics tool including computer readable code means for causing first data from the controller to be downloaded across the data communications network to the remote data processing unit.

In accordance with a third aspect of the present invention, a program product is disclosed. The program product includes a computer usable medium having computer readable program code embodied therein for causing a computer to display first data received across a data communication network from a controller associated with a wheelchair. The computer readable program code in the article of manufacture includes computer readable program code for causing the computer to effect downloading of the first data from a memory associated with the controller, and computer readable program code for causing the computer to effect displaying the first data on a video monitor. The first data includes at least one of error code data and drive parameter data.

One advantage of the present invention is the provision of a diagnostics tool and method which locally, or remotely via a modem, facilitates maintaining, troubleshooting, and repairing an electrical system of a motorized wheelchair.

Another advantage of the present invention is the provision of a diagnostics tool and method which permits wheelchair drive parameters to be viewed, added, deleted and modified locally or from a remote location.

Yet another advantage of the present invention is the provision of a diagnostics tool and method which permits a service technician to remotely or directly view an hour meter and an amp-hour meter of a wheelchair to determine the wheelchair usage.